

Creation

Day #2 of Creation: Separated Waters and Atmosphere

(Genesis 1:6-8)

INTRODUCTION

Take a deep breath. See how long you can go without breathing!

Today, we're going to talk about our atmosphere. [Teacher, write "**atmosphere**" on the board.] Do you know what that is? It's the air around the earth.

Before we get into our lesson, let's open in prayer...

OPENING PRAYER

Lord, give us understanding as we try to learn about how You created our world. Help us to try to imagine what it was like before You made the sky and air we breathe and the vast oceans. I pray You would excite us as we consider how fantastic it was for You to create our universe out of nothing. It's so perfect and wonderful! We stand in awe of You! Thank You Lord. In Jesus' name, I pray. Amen.

MEMORY VERSE

The heavens are Yours, and the earth is Yours; everything in the world is Yours—You created it all. (Psalm 89:11 NLT).

LESSON

Today we're going to talk about the second day of creation. But before we do, let's review what we learned last week. Before God got started creating the world, what was the universe like? (There was nothing, just total darkness.)

What was the first thing God did on the first day of Creation? (*God created the heavens and the earth.*)

At that point, what was the earth like? (It was a ball of water.)

The Bible says, the earth was without form and was totally in the dark. What was the next thing God did? (*He said, "Let there be light" and there was light.*)

Now God didn't create the sun, or the moon, or the stars until the fourth day of creation. So, what lit up the world? (*God Himself!*) Then the Bible tells us, "God separated the light from the darkness". What did God call the light? (*Day*) What did God call the dark? (*Night*)

When God created day time and night time, He not only wanted us to have a time to sleep, but He also wanted us to have a way to mark the passing of time.

So, on the 1st day of creation, God:

- Created the heavens and the earth
- Created light
- Separated light from dark (day time and night time)
- Gave us a way to mark time

Let's talk about the 2nd day of creation.

Genesis 1:6-8

And God said, "Let there be an expanse in the midst of the waters, and let it separate the waters from the waters." ⁷And God made the expanse and separated the waters that were under the expanse from the waters that were above the expanse. And it was so. ⁸And God called the expanse Heaven. And there was evening and there was morning, the second day. (ESV)

As we learned last week, when God created the heavens and the earth on the first day of creation there was no shape to the world and there was nothing in it, on it, or around it. It was a big ball of water. So, on the second day of creation, God made a space (an expanse) between the waters above and the waters below. In other words, He decided to separate the waters to form the sky. The sky is the whole mass of air surrounding the earth, which we call the *atmosphere*. So, God created the air we breathe and we call it *sky*.

Can you picture it? God parted the waters so there was water above the sky, and below the sky was a big ball of water.

The world was much different then than it is now. Now there is no water above the sky. But things didn't get the way we see them today until after the great Flood in Noah's time. When the great Flood came, the sky opened and the waters above it came down and flooded the earth. We'll be learning more about that in a few weeks.

Sky

Let's talk about the sky that God made on the second day of creation. Although you can't see it, our atmosphere is very important because it contains the air we need to breathe. It also gives the birds a place to fly. Our atmosphere is what makes it possible for life to exist on earth.

Air exists several miles above the earth. Gravity is what keeps the air from floating off into space. [Teacher, write "**gravity**" on the board.]

Air Pressure

How much does air weigh?

It may seem that the air is weightless, but actually air is matter. It takes up space and it has weight. Scientists call the weight of air, "air pressure."

In fact, air is pushing down on us from all directions all the time. The air in this room is several hundred pounds! We can't see it because air is invisible and we can't feel it even though the air pressure is always pushing on us from all sides at about 15 pounds of pressure per inch.

Why aren't our bodies crushed by the ever-present air pressure? Because we breath air, our bodies push back with pressure at an equal force so we don't get crushed.

Hot air rises and cool air sinks. That's how hot air balloons work. You heat the air in the balloon to make it rise and you cool the air so it will come back down to earth.

As air warms it gets lighter and rises, it creates a low-pressure area. The air gets gradually thinner as you go up in altitude. That means when you go up in altitude there is much less air pressing on you.

Normally we don't feel any of this unless the pressure changes suddenly. Have you ever had your ears pop when you go up in an airplane or while you are driving up a mountain in a car? Your ears pop because your body is reacting to the pressure change.

Barometers

There's lots of air surrounding our planet and it is held in place by gravity. Scientist measure that pressure with a tool called a *barometer*. [Teacher, write "**barometer**" on the board.]

Have you ever watched the weather report on TV? Weather men use barometers to study the air pressure so they can predict the weather. When the air pressure is low, it generally means bad weather with storms and precipitation. When the air pressure is high, it generally means good weather with clear skies.

What is air made of?

The air is made up of several different gases: nitrogen, oxygen and carbon dioxide. These are in just the right amounts. If there were a lot more oxygen, then a single spark could set the whole world on fire. If there were a lot more nitrogen, we would suffocate. Carbon dioxide is essential for plants to live, but is deadly to humans in large amounts. God put just the right amount of carbon dioxide in the atmosphere for the plants, but not so much that it kills off humans.

By comparison, the atmosphere on Mars is 95% carbon dioxide. This is one reason why people could not live on Mars without special breathing equipment. If you go to the moon, you'd have to wear a space suit and an oxygen mask to stay alive. You'd also have to wear heavy shoes with weights in them to be able to walk around; otherwise, you'd just float around like a helium balloon.

In fact, there is no other planet that has an atmosphere that is right for people or plants to live in! God created the perfect place for us to live.

Water

Now let's talk about the water God provided for us. We drink it, cook with it, wash in it, and swim in it. Most of us just take it for granted. We turn on the tap and out it comes. However, not everyone is so fortunate; some people have to pump it out of the ground, and others need to carry it long distances from wells or rivers.

Without water we would die in a few days. Did you know that the human body is made up of mostly water? The **human body** is 65 percent **water**, and it takes an average of eight to ten cups to replenish the **water** our bodies lose each day.

The water in our blood is very important. First, it carries all the vitamins and minerals from the food we eat to the rest of our body. Water also flushes our bodies of waste products, like carbon dioxide. It also helps to regulate our temperature. When we sweat, it helps to cool us down.

Water can be found in 3 states: liquid, solid (ice), and vapor (steam.)

[Teacher, demonstrate these 3 states by filling a water bottle ½ way with hot water and placing an ice cube on top. That will produce steam in the upper part of the bottle.]

Did you know that the earth is the only place in the universe known to have liquid water? The earth is covered 70% by water. And, even though only about 1% of the world's water is ready to drink, it is enough for all the people in the world. (97% is too salty and 2% is ice.)

Ice Floats

When water freezes the molecules expand and trap air in between them. That is why ice floats. God cleverly designed ice to float so that lakes and oceans would freeze from the top down. That way the fish can continue to live underneath the ice. If the oceans and lakes all froze from the bottom up, every living thing in the water would freeze to death.

Wrapping up

God took great care in making our world a perfect place for us to live because He loves us so much. The word of God tells us that He did all this to bring Himself glory and to bring us pleasure.

Next week we're going to learn about how God created dry land and planted trees and other vegetation.

But so far, we've learned that on the first day God created the heavens and the earth, light and time. Then on the second day of creation, God separated the waters and created the atmosphere we call the sky. (Review today's verse.)

Closing Prayer

Lord, thank You for creating the perfect atmosphere for us to live in. We think You are wonderful to make us a world that is just right for us to live. In Jesus' name, I pray. Amen.

LEARNING CENTERS

Imagination Station

(Craft Center)

Make Pictures of the Sky

Use blue construction paper and cotton ball clouds. Remind the children that on the second day of creation God had not yet made the sun or birds. Talk about the properties of the air we breathe and how God made it just right for people to breath and plants and trees to grow in.

Fun House

(Game Center)

Match the Day

Prepare flash cards for numerals one through seven. Arrange the creation visuals prepared in Lesson One out of sequence and hold up one of the numeral flash cards. A child may take the card and hold it up to the corresponding creation visual. Continue with the same procedure. For variety, a child may be "teacher."

This would make a good pre-session, quiet activity to be used by an individual child or small group (as a game) in placing the correct numeral card on the corresponding creation visual. Also, several sets could be made from magazine pictures. Make a collage out of pictures of things that were created on each day of creation. For example, make a land and sea collage or a bird and fish collage and a man and beast collage and so forth. Have children compete to see who matches all the number flash cards to the pictures first.

God's Weird and Wonderful World

(Science Center)

Choose one of the following science activities:

1. Discover How Life was on Earth Before the Flood

An effective way to communicate that there were differences before the flood is to draw a picture of our planet on a black board and ask the children about characteristics of our planet, earth. This is a good way to bring them into the discussion.

Key Points

- There was no rain before the flood (Genesis 2:5).
- Earth was watered by a mist (Genesis 2:6).
- People had longer life spans (Genesis 5).
- Plants and animals grew larger.
- Theory of the vapor canopy is one possible idea to explain the above.

Teacher Background Information

The theory of the vapor canopy is based on Genesis 7:11, where it states that the windows of heaven were opened. Also, in Genesis 1, God divided the waters that were on the earth from the waters that He placed above the earth--He put an atmosphere in between the two. This means that there were waters above our atmosphere that are not there today. These were not clouds because clouds would have produced rain. If the water was in a vapor state and formed a canopy, then there would be a warm tropical temperature extending over all the earth. That would account for the larger plants and animals and longer life span. (Refer to www.ChristianAnswers.net for more detail.)

"And, incidentally, the declining life-span after the Flood seems to fit in perfectly with our concept of the dissipation of the earth's protective blanket during the Flood. Perhaps the most important effect of the canopy was

the shielding action provided against the intense radiation impinging upon the earth from space. Short wave-length radiation, as well as bombardment of elementary particles of all kinds, is known to have damaging effects--both somatic and genetic effects--on organisms and this is generally true for all types of radiation." (The Genesis Flood, John C. Whitcomb and Henry M. Morris, pg. 399)

Teach the children about the unique features of water. Begin by introducing the three states of water, (water, ice and water vapor or steam). Few other substances are ever naturally found in more than two states. Explain that one drop of water is made up of billions of molecules. Molecules are small parts that we can't see without a powerful microscope. If you are working with small children, have them act out the concept, in a group of how ice molecules move very slowly and are very close together, water molecules move a little further apart and faster and vapor moves even faster and moves farther apart.

Water's molecular makeup seems to explain some of its rather strange properties. Going by other similar compounds, water should be a gas at room temperature. Water's boiling point is far higher than that of any similar compound. Water expands, rather than contracts as it freezes. That is why ice floats. Have the children explain what problems there would be if the oceans and lakes all froze from the bottom up.

2. Demonstrate Water Molecules

To reinforce the idea of water molecules, measure one half cup of water and a half a cup of rubbing alcohol and pour into a measuring cup. One would think that the water and alcohol would be equal to one cup but because of the spaces in the molecules, even though we can't see them, it does not equal one cup. When the two liquids are mixed, molecules of water get into the spaces between the alcohol molecules, and the alcohol molecules get into the spaces between the water molecules.

When molecules get close enough, in a liquid for instance, they attract, or pull, one another strongly. At the surface of the liquid the pull downward and sideways creates a condition called surface tension. The surface acts like a tough, elastic skin. Water molecules are attracted to each other more strongly than many other things. Have small groups of children gather around bowls of water. Give one of the children a pepper shaker and a toothpick with the tip dipped in oil. Have them shake the pepper onto the surface of the water and then touch the surface of the water in the center with the toothpick. This will break the surface tension. Let each child have a turn at repeating the process.

3. Demonstrate the Weight of Air or Air Pressure

Materials

- Glass of water
- Paper plate or index card
- Hot plate
- Empty pop cans
- Pot holder or tongs
- Tray of cool water

The air above us exerts an average pressure of 2,100 pounds upon each square foot of surface, or about fifteen pounds per square inch. If air had no weight, then the wind could have no force and barometers would read zero pressure. The following describes two methods to demonstrate air pressure or the weight of air:

1. **Magic Water Glass Trick.** Fill a glass one third with water. Cover the mouth with an index card and invert (holding the card in place) over a sink. Remove your hand from the card. Voila! The card stays in place because air is heavier than water, and the card experiences about 15 pounds of force pushing upward by the air and only about one pound of force pushing downward from the water - hence the card stays in place. **Note:** You must take care that the paper maintains a good seal, and do not tilt the glass. Practice this over the sink.
2. **Squished Soda Can.** Heat an empty soda can (large beer cans actually will work better if you have one) in a skillet with a few tablespoons of water in the can over a hot stove. Have a shallow dish with about $\frac{1}{4}$ inch of ice water handy (enough water to make a seal with the top of the can). When the can emits steam, grab the can with tongs and quickly invert it into the dish. CRACK! The air in the can was heated, and things that are hot tend to expand. When you cool it quickly by taking it off the stove onto a cold plate, the

air cools down and shrinks, creating a lower pressure inside. Since the surrounding air outside of the can is now higher, it pushes on all sides of the can and crushes it.

Scientific Explanation

It may seem that the air is entirely weightless. However, each cubic foot of air actually weighs about one-tenth of a pound. The air in a typical room thus adds up to several hundred pounds.

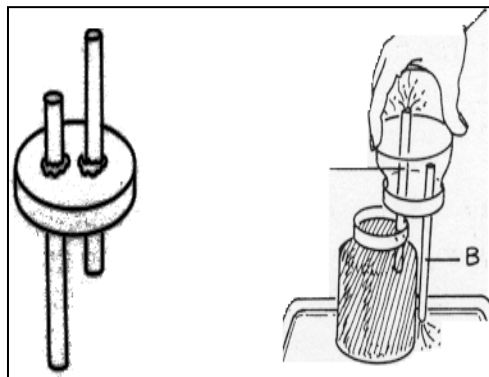
Air exists for several miles above the earth, gradually thinning with altitude. Gravity attraction keeps the air “attached” to earth. It is the weight of this air layer that results in atmospheric pressure on the earth. The pressure exists in all directions; hence it pushes upward on the card under the glass as well as against the sides of the pop cans in the demonstrations.

Why aren't our bodies crushed by the ever-present air pressure? We are not affected because we are an “open system.” By breathing air, we maintain largely the same pressure inside as outside our bodies. If we dive deeply into water, we quickly feel additional pressure from the weight of the water above us.

4. Demonstrate How Air Pressure Can Be Used to Produce a Spraying Fountain

Materials

- 1 16-penny sized nail
- 2 straws
- Hammer
- Modeling clay
- Adult helper
- Green food coloring
- Ruler
- Baking dish
- 2 pint jars, one with a lid



Procedure

- Ask an adult to use the hammer and nail to make two holes in the lid.
- Push one straw through a hole so that two inches extends above the lid.
- Push another straw through the other hole so two inches extend below the lid.
- Use small pieces of modeling clay to seal the opening between the straws and the lid.
- Fill one jar half full with water and screw on the lid.
- Fill the second jar with water and add enough food coloring to turn it dark green.
- Set the jar of colored water in a baking dish.
- Turn the jar with the straws through the lid upside down with the shortest straw beneath the colored water in the jar.
- Observe the ends of the two straws.

Results

Colored water rises and sprays out of straw A inside the closed jar. Water from the closed jar runs out of straw B and into the open baking dish.

Why?

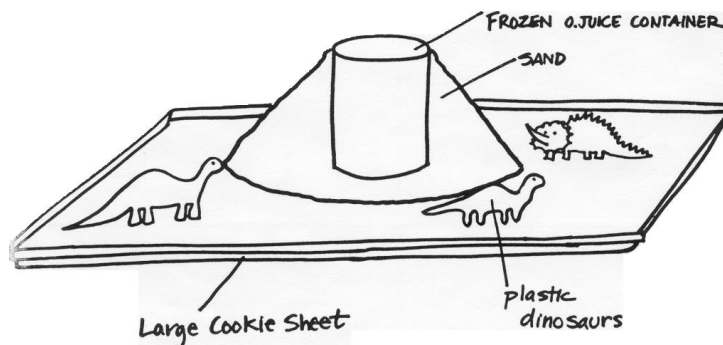
Gravity (the downward pull toward the center of earth) pulls the water out of the closed jar and down through straw B. As the water leaves, the air in the jar spreads out, and the air pressure inside the closed jar is reduced. The air pressure outside the closed jar is now greater than the air pressure inside the jar. The air pushing down on the colored water forces the water up and out of straw A. The result is a spraying fountain inside the closed jar.

5. Demonstrate an Erupting Volcano

Purpose: To simulate a volcanic eruption.

Materials

- Frozen orange juice container
- 1/4 cup baking soda
- Large cookie sheet
- 1 cup water
- Sand
- 3/4 cup white vinegar
- 1/2 cup dish soap
- 8 drops red food coloring



Procedure

1. Put dish soap, baking soda, and red food coloring in the orange juice container.
2. Shape moist sand around the container to form a volcano. Do not cover the container's mouth or get sand inside it.
3. Mix the water and the white vinegar in a separate bottle.
4. When it's time for the eruption, pour the vinegar and water into the "volcano."

Results

Red foam sprays out the top and down the mountain of sand.

Why?

The baking soda reacts with the vinegar to produce carbon dioxide gas. The gas builds up enough pressure to force the liquid out the top of the container. The mixture of the gas and the liquid produces the foam.

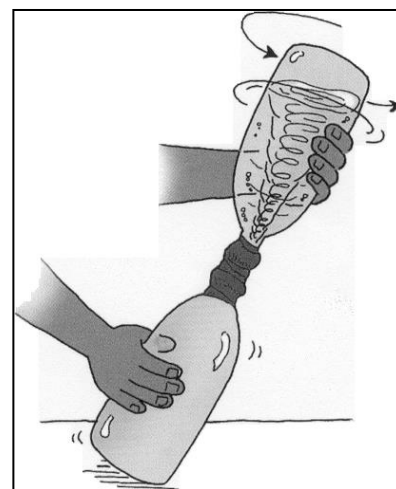
6. Demonstrate How Tornadoes Work

Materials

- Water
- Two 2-liter cola bottles
- Cardboard
- Scissors
- Tape

Procedure

- Pour water into a 2-liter plastic bottle until it is about $\frac{3}{4}$ full.
- Cut a circle of cardboard as big around as the bottle's opening.
- Then cut a $\frac{1}{4}$ -inch hole in the center.
- Place the cardboard circle on top of your water bottle's opening.
- Turn another 2-liter bottle upside down and tape the two bottles together, top-to-top.
- Wrap the bottlenecks with tape so the connection doesn't leak.
- Now hold the bottles so the full bottle is upside-down on top.
- With one hand, hold the bottom bottle to steady it.
- With the other hand, begin moving the top bottle in a circle.
- Watch what happens: a tornado in a bottle!



Water tornadoes, such as the one we just made, happen in nature too. When a tornado forms over water, it's called a waterspout.

7. Demonstrate How Fog is Formed

Materials

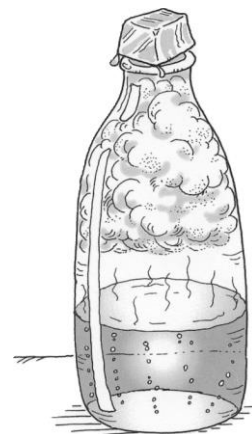
- 1-liter cola bottle
- Hot water
- Rubbing alcohol
- Ice cube

Procedure

1. Fill a bottle 1/3 full with very hot water.
2. Add a few drops of rubbing alcohol.
3. Put a piece of ice over the top of the bottle, and watch fog develop.

Explanation

Fog is a cloud that forms very close to the ground. In nature, when a mass of cold air bumps into a mass of warm humid air, millions of tiny droplets of water are formed. That's fog. This is a way to get some cold air and some warm air together and make fog.



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